Appendix 14: The route from Glasgow to Heathrow

When I was planning this Tutorial, I decided to abandon the previous London to Dublin route as being a little too straightforward to best demonstrate the sexy new facilities of version 1.3. — which left me with a decision to make about what route to choose. After looking at numerous alternatives in detail (some of which Hardy felt were a little unkind to inflict on beginners — he is a kinder soul than I am ☺) I ended up with a fairly simple hop from Glasgow to Heathrow, with a hold on the way in (which is almost inevitable in southern England airspace).

But how did I establish what route to follow?

I *could* (and in version 1.2c I *would*) have simply established a series of waypoints which would get me from the end of the take-off SID to the start of the landing STAR. That could have still been an option, and in that case I would have used John Howe's excellent (and free) RoutPlan software, which you can download from http://www.btinternet.com/~gonewest/RoutPlan/index.htm [110] (at the time of writing, anyway). This is probably the simplest way when you first want to design your own route.

Version 1.3 comes with an in-built airways database. There were originally slight problems with it in Europe since many of the airways unfortunately changed just after that version of the database was released, but the availability of an up-to-date database has solved that problem for European flyers. In 1.3 it is essential to have airways information so that we can enter the airways into the FMC as would be the case in the real aircraft, without entering every waypoint as was previously the case.

First of all, I looked at my available charts. If you don't have any, then I can recommend the SAS Flight Support Electronic Route Manual charts which are available from http://www.dalnet.se/sasfss/. Current charts are available on CD for a reasonable sum (and at the time of writing, each week sees a free sample selection of these available for free download). Thanks to the kindness of Bertil Gullmar, the examples in this Tutorial are from that source, although owing to the method I used to transfer them into this document, they are slightly degraded in quality compared to the originals. Since the publication of the previous version of the Tutorial, however, another source has become available — Jeppesen's SimCharts, published specially for the simming community. One CD covers not only Britain, but much of Europe, too [111]: these can also stay on the CD until needed, and can be printed out as and when you need them. If you want to buy them online, try http://www.jeppesenpcpilot.com/ . They are of reasonable quality, although I am of the opinion that the quality of the Swissair material from SAS Flight Support is better (and often in colour, too). Finally, some British charts are available free online — try http://www.ais.org.uk/ or search the Aerowinx forum for references to this source. But one way or another, it is extremely useful to have access to some charts if you want to plan your own route.

The full set of charts I used was as follows:—

- Glasgow airport (to decide at which stand your aircraft was to be parked).
- Glasgow SIDs (Standard Instrument Departures) for runway 05 (see below)

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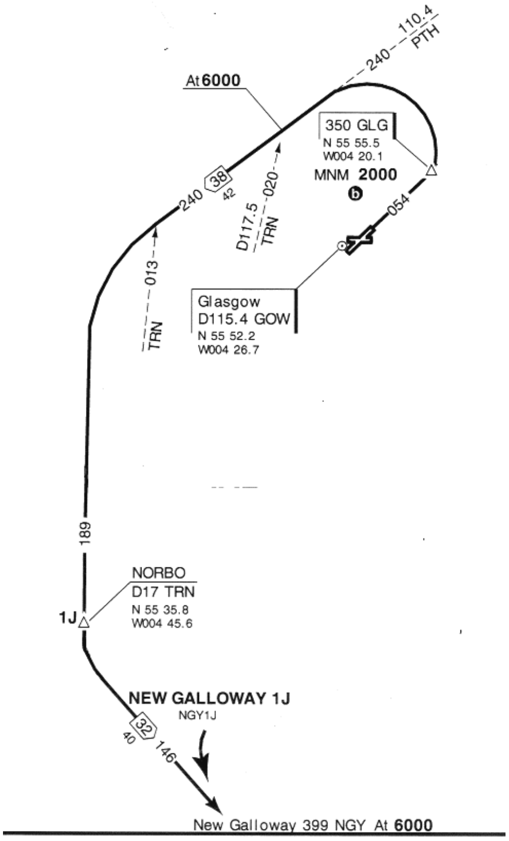
[110] At the same URL you will also find John's FuelPlan software, specially for version 1.3 — see later in this Appendix. For a very full (shareware) implementation of a Flight Planner using Microsoft Excel, also visit Doug Snow's PS1FPLAN site at http://www.ps1fplan.com/ (the 1.3 version is due for release at about the same time as this Tutorial).

[111] According to the Jeppesen website, the CD covers: Austria, Azores, Belgium, Bosnia Herzegovina, Croatia, Denmark, Finland, France, Germany, Gibraltar, Greece, Greenland, Iceland, Ireland, Italy, Luxembourg, Macedonia FYR, Madeira Islands, Malta, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and Yugoslavia.

- En route (high altitude) chart of the UK to check out the airways [112]
- Heathrow STARs (Standard Terminal Arrival Routes)
- Heathrow approach charts (ILS approach for runway 09L)
- Heathrow airport (to establish which stand we would park at for shutdown)



Looking at the en route chart, it was immediately obvious that the best way to go would be via airway UA1, which would take us from Deans Cross all the way down to Honiley. The first thing to look for was therefore a SID which would get us away from Glasgow and point us in the direction of DCS, and the New Galloway 1J SID (right) was just the job. From NGY it's an easy hop to DCS, and we're headed for the warm south. (Well, *relatively* warm — we are talking London, here ☺).

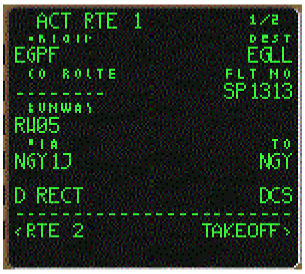
Since these charts present a *lot* of information in a highly coded fashion, I have included a couple of different examples as Appendix 15. Hopefully, the comments there will enable you to extract all the information which is given.

But I also needed an electronic version of the SID and STAR to use with the FMC. I quickly found what I needed on the Aerowinx website (http://aerowinx.com/html/deparr_eur.html). Thanks to the kindness of Philippe Coraboeuf, I am able to include his Glasgow SIDs with the Tutorial distribution. The Heathrow STAR I obtained from the same source — also courtesy of Philippe ☺ (although the Glasgow SID and Heathrow STAR included with this Tutorial have been slightly tweaked by Hardy to better agree with the charts given here). Be sure to also visit Philippe's own site (http://www.multimania.com/cbf/), where you will find numerous additional SIDs and STARs for download.

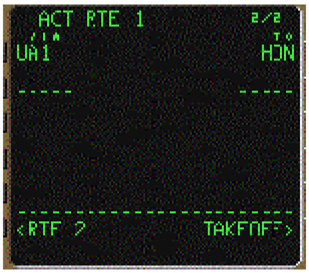
So now I had established our route:—

From Glasgow rwy 05, follow the New Galloway One Juliet SID to NGY, then go direct to Deans Cross (DCS). Join airway UA1: in this case we will be following it all the way to Honiley (HON), where we will join the Bovingdon 1A STAR which routes us through to the hold at Bovingdon (BNN). Once released from the hold, we will then follow the Approach for ILS 09L, taking us over Windsor castle and on to the runway.

On the RTE pages, it will look something like this whilst we are in Glasgow (and hence won't know what STAR we will receive from ATC):—



```
ACT RTE 1              1/2
ORIGIN                DEST
EGPF                  EGLL
CO ROUTE            FLT NO
--------            SP1313
RUNWAY
RW05
VIA                     TO
NGY1J                  NGY
DIRECT                 DCS
--------------------------
<RTE 2            TAKEOFF>
```

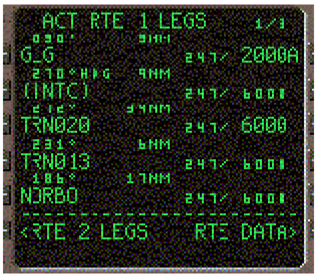


```
ACT RTE 1              2/2
VIA                     TO
UA1                    HON
-----                -----



--------------------------
<RTE 2            TAKEOFF>
```

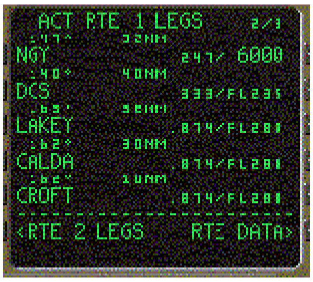
---

[112] If you don't have en route charts, and would like a good starting point (taking into account some airways, but not necessarily exactly those in the database provided on the PS1 CD) then try visiting http:// www.asalink.net/davideg/rfquery.html. I'll show you an example route obtained from that site, soon. Or if your trip is entirely within the U.S. you might visit http://www.fltplan.com/.

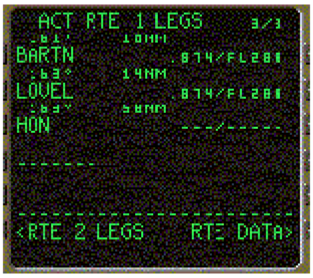
But on the LEGS pages, we see the expansion, especially of “DIRECT DCS … via UA1 to HON”:—



```
 ACT RTE 1 LEGS     1/3
 090°       9NM
G_G             247/ 2000A
 270°HDG    9NM
(INTC)          247/ 6000
 212°      24NM
TRN020          247/ 6000
 231°       6NM
TRN013          247/ 6000
 186°      17NM
NORBO           247/ 6000
------------------------
<RTE 2 LEGS    RTE DATA>
```

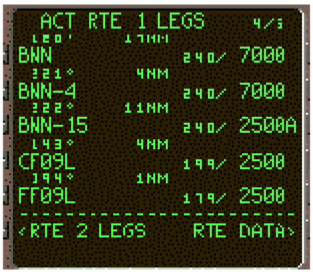


```
 ACT RTE 1 LEGS     2/3
 147°      32NM
NGY             247/ 6000
 140°      40NM
DCS             333/FL235
 165°      36NM
LAKEY          .874/FL280
 162°      30NM
CALDA          .874/FL280
 162°      10NM
CROFT          .874/FL280
------------------------
<RTE 2 LEGS    RTE DATA>
```

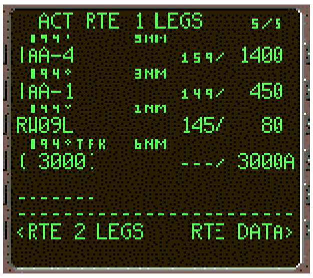


```
 ACT RTE 1 LEGS     3/3
 161°      10NM
BARTN          .874/FL280
 163°      14NM
LOVEL          .874/FL280
 163°      58NM
HON            ---/-----

-------
------------------------
<RTE 2 LEGS    RTE DATA>
```

(....or something similar). Note how the airways database has expanded UA1 into all the intermediate waypoints between DCS and HON for you. And later, once the STAR is known and the Heathrow stuff has been added into the mix, you will get additional pages looking something like this:—

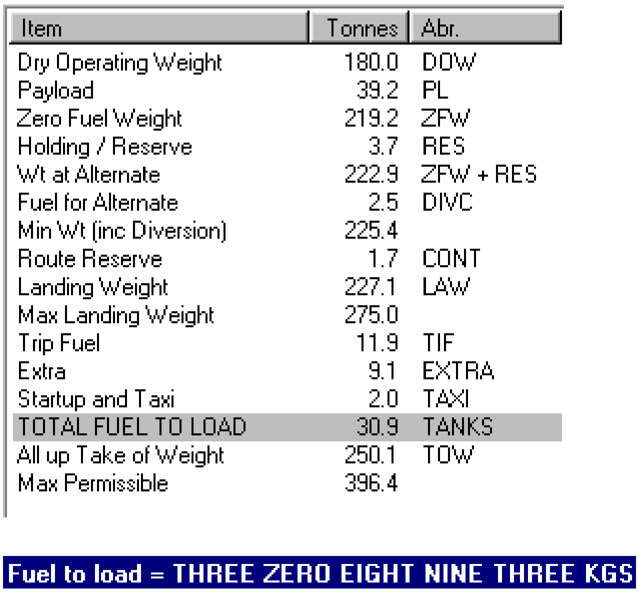


```
 ACT RTE 1 LEGS     4/5
 120°      17NM
BNN             240/ 7000
 221°       4NM
BNN-4           240/ 7000
 222°      11NM
BNN-15          240/ 2500A
 143°       4NM
CF09L           199/ 2500
 194°       1NM
FF09L           179/ 2500
------------------------
<RTE 2 LEGS    RTE DATA>
```



```
 ACT RTE 1 LEGS     5/5
 094°       3NM
IAA-4           159/ 1400
 094°       3NM
IAA-1           149/  450
 094°       1NM
RW09L           145/   80
 094°TFK    6NM
( 3000)         ---/ 3000A

-------
------------------------
<RTE 2 LEGS    RTE DATA>
```

Exactly how that stuff gets programmed into the FMC is covered in detail in the main Tutorial. The height and speed restrictions are all given on the appropriate charts, and our cruise altitude will be determined by the fuel plan. When it came to fuel I could have used the comprehensive PS1FPLAN, but since ours is only a (very) short hop for a 747, I opted for simplicity and used John Howe’s excellent (and free) FuelPlan package. You can download this useful software from http://www.btinternet.com/~gonewest/RoutPlan/index.htm The fuel plan (right) assumes that Heathrow will be our primary, that the diversionary (or alternate, in American usage) airport will be Gatwick, and that we have a fairly full load of passengers and some freight. Nevertheless, as you can see, our fuel load is only 30.9 (thousand Kgs) including a reserve of 1.7 Kgs, and the ZFW figure is 219.2 Kgs. Notice also that we’re a lot lighter than our maximum permissible weight — so our take-off performance could be somewhat sprightly unless we de-rate it ☺.



Item	Tonnes	Abr.
Dry Operating Weight	180.0	DOW
Payload	39.2	PL
Zero Fuel Weight	219.2	ZFW
Holding / Reserve	3.7	RES
Wt at Alternate	222.9	ZFW + RES
Fuel for Alternate	2.5	DIVC
Min Wt (inc Diversion)	225.4	
Route Reserve	1.7	CONT
Landing Weight	227.1	LAW
Max Landing Weight	275.0	
Trip Fuel	11.9	TIF
Extra	9.1	EXTRA
Startup and Taxi	2.0	TAXI
TOTAL FUEL TO LOAD	30.9	TANKS
All up Take of Weight	250.1	TOW
Max Permissible	396.4	

Fuel to load = THREE ZERO EIGHT NINE THREE KGS

Now for the charts: let’s look at the SID first of all [113] (please bear in mind that these charts are published here with the kind permission of Team FSS but are reduced in quality by me (owing to the process I used to transfer them into this document) compared to the originals):—

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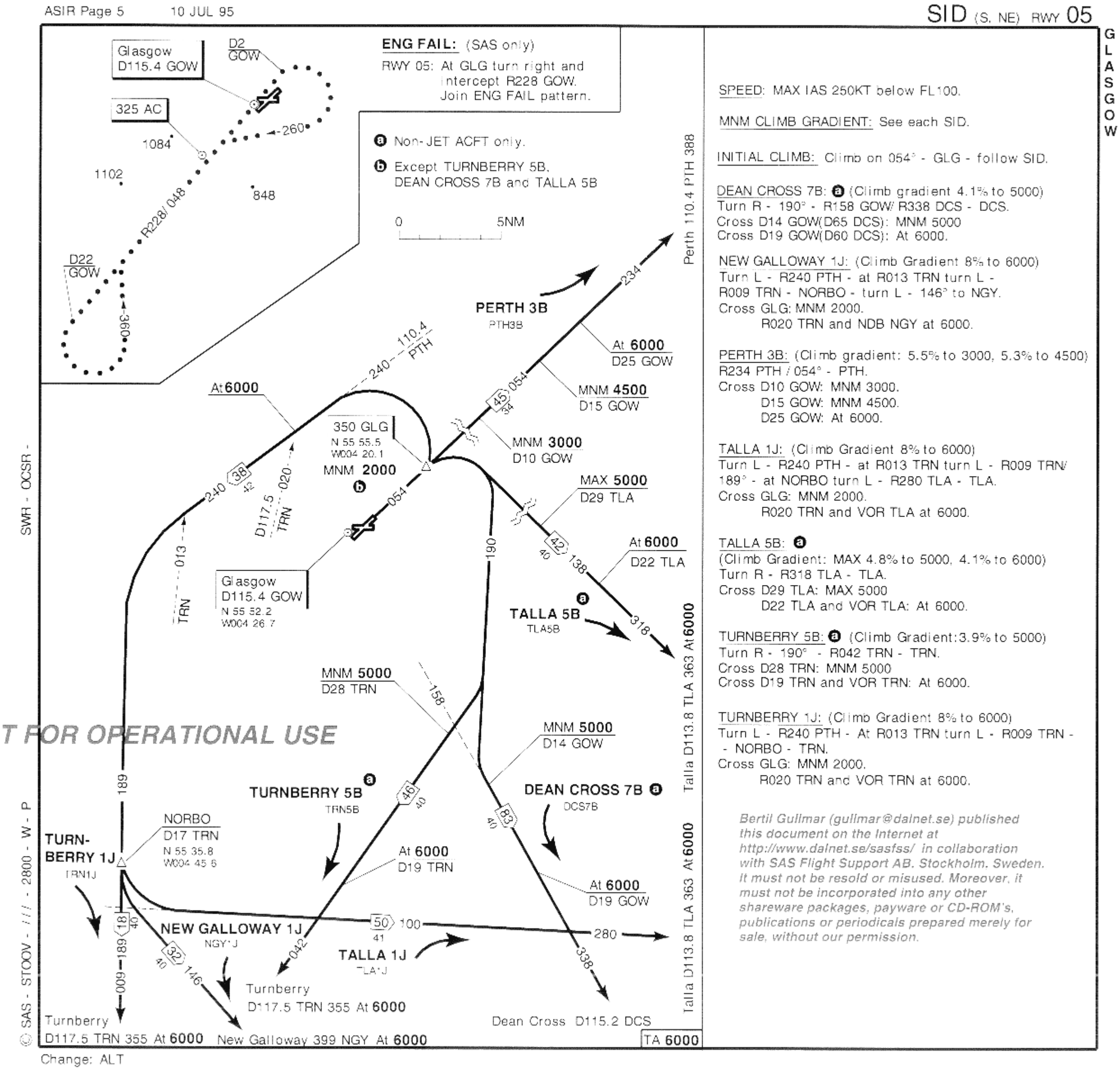
[113] You will notice that in the SID chart shown above I had removed the other SIDs for the sake of clarity — the one below is the same chart without the “benefit” of any electronic erasure.



SID (S, NE) RWY 05

SPEED: MAX IAS 250KT below FL100.

MNM CLIMB GRADIENT: See each SID.

INITIAL CLIMB: Climb on 054° - GLG - follow SID.

DEAN CROSS 7B: ⓐ (Climb gradient 4.1% to 5000)
Turn R - 190° - R158 GOW/ R338 DCS - DCS.
Cross D14 GOW(D65 DCS): MNM 5000
Cross D19 GOW(D60 DCS): At 6000.

NEW GALLOWAY 1J: (Climb Gradient 8% to 6000)
Turn L - R240 PTH - at R013 TRN turn L -
R009 TRN - NORBO - turn L - 146° to NGY.
Cross GLG: MNM 2000.
R020 TRN and NDB NGY at 6000.

PERTH 3B: (Climb gradient: 5.5% to 3000, 5.3% to 4500)
R234 PTH / 054° - PTH.
Cross D10 GOW: MNM 3000.
D15 GOW: MNM 4500.
D25 GOW: At 6000.

TALLA 1J: (Climb Gradient 8% to 6000)
Turn L - R240 PTH - at R013 TRN turn L - R009 TRN/
189° - at NORBO turn L - R280 TLA - TLA.
Cross GLG: MNM 2000.
R020 TRN and VOR TLA at 6000.

TALLA 5B: ⓐ
(Climb Gradient: MAX 4.8% to 5000, 4.1% to 6000)
Turn R - R318 TLA - TLA.
Cross D29 TLA: MAX 5000
D22 TLA and VOR TLA: At 6000.

TURNBERRY 5B: ⓐ (Climb Gradient:3.9% to 5000)
Turn R - 190° - R042 TRN - TRN.
Cross D28 TRN: MNM 5000
Cross D19 TRN and VOR TRN: At 6000.

TURNBERRY 1J: (Climb Gradient 8% to 6000)
Turn L - R240 PTH - At R013 TRN turn L - R009 TRN -
- NORBO - TRN.
Cross GLG: MNM 2000.
R020 TRN and VOR TRN at 6000.

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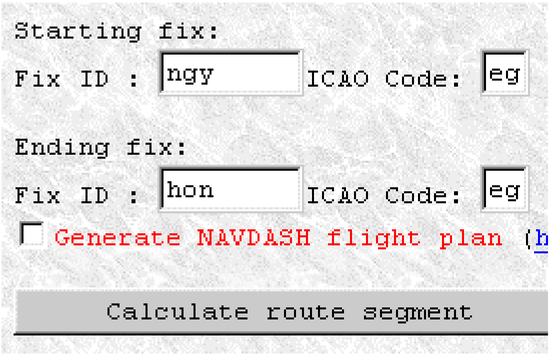
As you may notice, following the left turn onto 240°, we achieve and *maintain* 6000 ft so as to stay well below any arrivals traffic as we cross the extrapolated runway centreline after we turn south towards NORBO. If there's not much Prestwick or other traffic, maybe ATC will allow us to start to climb to our cruising altitude sooner than the SID indicates, however . . . .



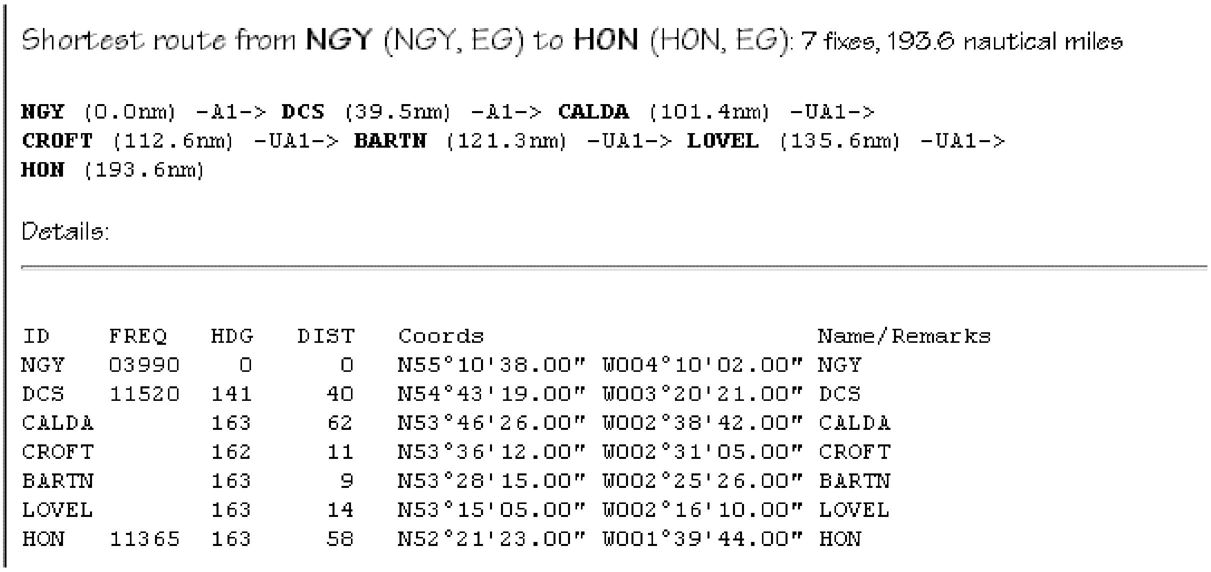
Starting fix:
Fix ID : ngy ICAO Code: eg

Ending fix:
Fix ID : hon ICAO Code: eg

☐ Generate NAVDASH flight plan (h

In a footnote earlier in this Appendix I mentioned a web site which can provide airways routes for those without en route charts — here on the left is the request (airports are not included in the database, so I usually request from the end of the SID to the beginning of the STAR).

And on the next page you can see the result which it brought back, which also confirms out choice of UA1 as we can see from the heading. (The 'EG' is the country code, by the way, as in EGpf, EGll).



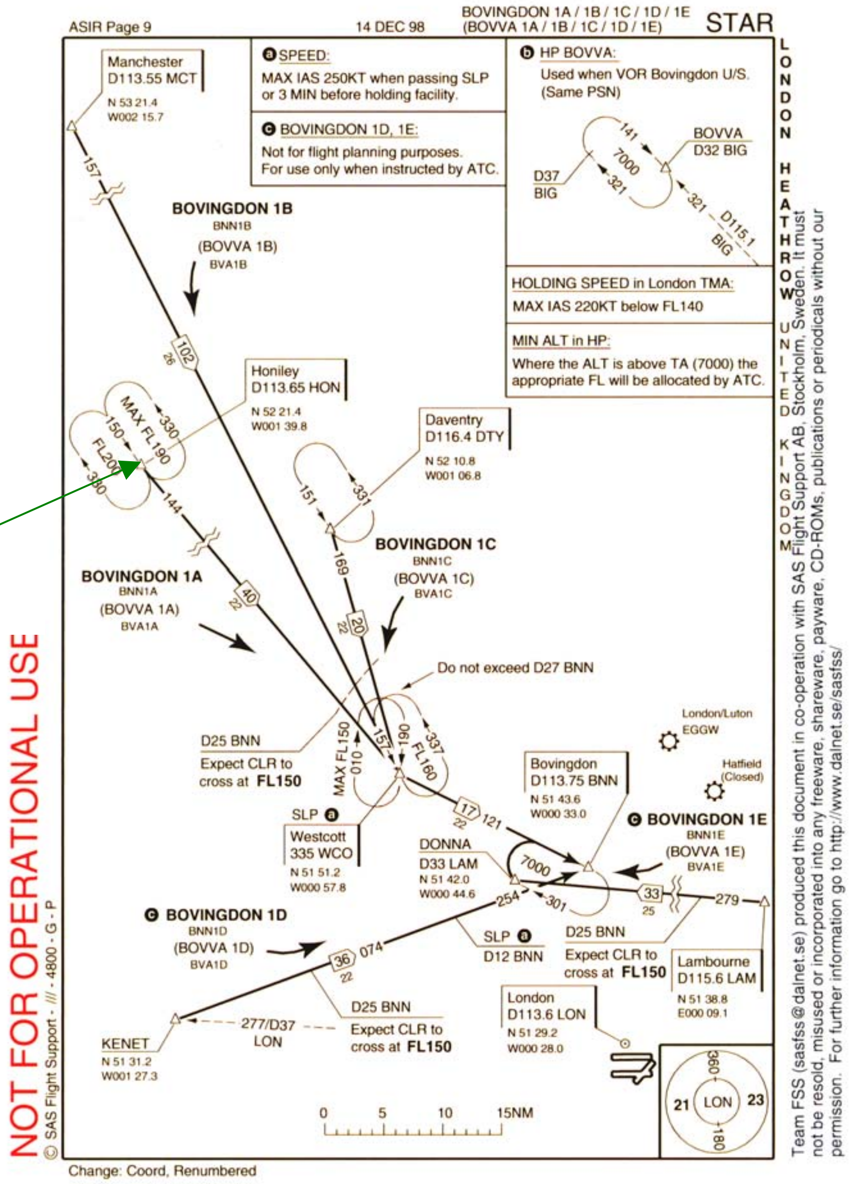
Shortest route from **NGY** (NGY, EG) to **HON** (HON, EG): 7 fixes, 193.6 nautical miles

```
NGY (0.0nm) -A1-> DCS (39.5nm) -A1-> CALDA (101.4nm) -UA1->
CROFT (112.6nm) -UA1-> BARTN (121.3nm) -UA1-> LOVEL (135.6nm) -UA1->
HON (193.6nm)
```

Details:

```
ID     FREQ   HDG   DIST   Coords                        Name/Remarks
NGY    03990    0      0   N55°10'38.00" W004°10'02.00" NGY
DCS    11520  141     40   N54°43'19.00" W003°20'21.00" DCS
CALDA         163     62   N53°46'26.00" W002°38'42.00" CALDA
CROFT         162     11   N53°36'12.00" W002°31'05.00" CROFT
BARTN         163      9   N53°28'15.00" W002°25'26.00" BARTN
LOVEL         163     14   N53°15'05.00" W002°16'10.00" LOVEL
HON    11365  163     58   N52°21'23.00" W001°39'44.00" HON
```

At Honiley, we join the STAR to BNN (where I strongly suspect ☺ that we will have a chance of practising our Hold technique):—


ASIR Page 9
14 DEC 98
BOVINGDON 1A / 1B / 1C / 1D / 1E
(BOVVA 1A / 1B / 1C / 1D / 1E)
STAR
LONDON HEATHROW UNITED KINGDOM
Manchester D113.55 MCT N 53 21.4 W002 15.7
Ⓐ SPEED: MAX IAS 250KT when passing SLP or 3 MIN before holding facility.
Ⓒ BOVINGDON 1D, 1E: Not for flight planning purposes. For use only when instructed by ATC.
Ⓑ HP BOVVA: Used when VOR Bovingdon U/S. (Same PSN)
BOVVA D32 BIG
D37 BIG
141
7000
321
321 D115.1 BIG
HOLDING SPEED in London TMA: MAX IAS 220KT below FL140
MIN ALT in HP: Where the ALT is above TA (7000) the appropriate FL will be allocated by ATC.
157
BOVINGDON 1B
BNN1B
(BOVVA 1B)
BVA1B
102
26
Honiley D113.65 HON N 52 21.4 W001 39.8
Daventry D116.4 DTY N 52 10.8 W001 06.8
MAX FL190
330
150
FL200
330
144
151
331
169
BOVINGDON 1C
BNN1C
(BOVVA 1C)
BVA1C
BOVINGDON 1A
BNN1A
(BOVVA 1A)
BVA1A
40
22
20
22
Do not exceed D27 BNN
D25 BNN Expect CLR to cross at FL150
MAX FL150
010
157
190
337
FL160
SLP Ⓐ
Westcott 335 WCO N 51 51.2 W000 57.8
17
22
121
DONNA D33 LAM N 51 42.0 W000 44.6
7000
254
301
Bovingdon D113.75 BNN N 51 43.6 W000 33.0
London/Luton EGGW
Hatfield (Closed)
Ⓒ BOVINGDON 1E
BNN1E
(BOVVA 1E)
BVA1E
33
25
279
SLP Ⓐ D12 BNN
D25 BNN Expect CLR to cross at FL150
Lambourne D115.6 LAM N 51 38.8 E000 09.1
Ⓒ BOVINGDON 1D
BNN1D
(BOVVA 1D)
BVA1D
36
074
22
D25 BNN Expect CLR to cross at FL150
277/D37 LON
KENET N 51 31.2 W001 27.3
London D113.6 LON N 51 29.2 W000 28.0
0 5 10 15NM
360
21
LON
23
180
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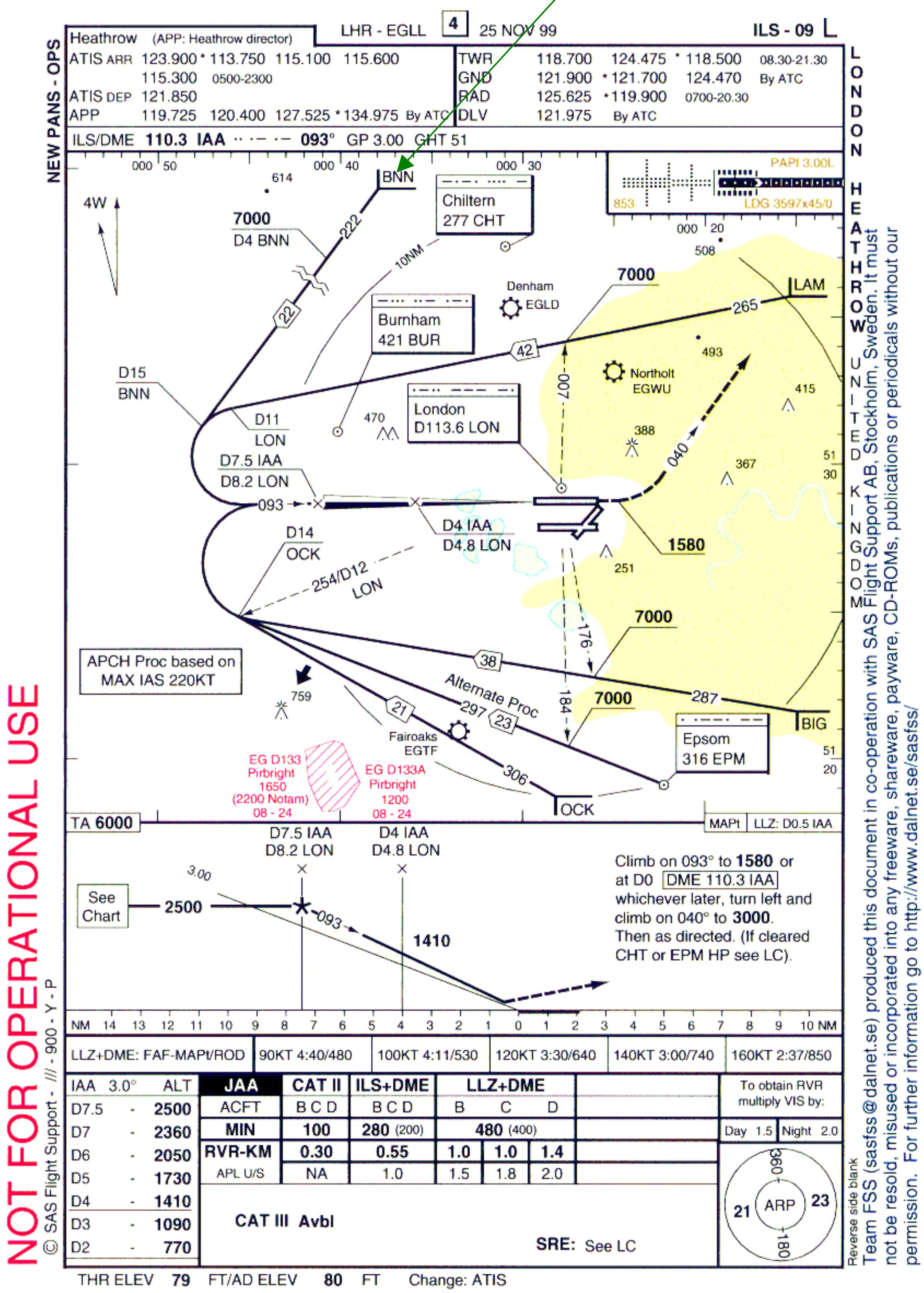
Change: Coord, Renumbered

We come in from here

And when we're finally released from the hold at BNN, it will be time to follow the ILS approach chart for Heathrow's runway 09L:—

We come in from here



(The charts are included in this Appendix for reasons of space, although reference will be made to them from the main Tutorial).